

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:

see form PCT/ISA/220

PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2005/041714

International filing date (day/month/year)
14.11.2005

Priority date (day/month/year)
12.11.2004

International Patent Classification (IPC) or both national classification and IPC
INV. A62D3/00

Applicant
BATTELLE MEMORIAL INSTITUTE

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☒ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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Date of completion of
this opinion

see form
PCT/ISA/210

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**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2005/041714

Box No. I Basis of the opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1 (b)).
2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ on paper
 - ☐ in electronic form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in electronic form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. II Priority

1. ☒ The validity of the priority claim has not been considered because the International Searching Authority does not have in its possession a copy of the earlier application whose priority has been claimed or, where required, a translation of that earlier application. This opinion has nevertheless been established on the assumption that the relevant date (Rules 43*bis*.1 and 64.1) is the claimed priority date.
2. ☐ This opinion has been established as if no priority had been claimed due to the fact that the priority claim has been found invalid (Rules 43*bis*.1 and 64.1). Thus for the purposes of this opinion, the international filing date indicated above is considered to be the relevant date.
3. Additional observations, if necessary:

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

International application No.
PCT/US2005/041714

Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	
	No: Claims	<u>1-35</u>
Inventive step (IS)	Yes: Claims	
	No: Claims	<u>1-35</u>
Industrial applicability (IA)	Yes: Claims	<u>1-35</u>
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V.

1 Reference is made to the following document:

- D1: KIM, KWAN SOO ET AL.: "Selective oxidation of allylic and benzylic alcohols using potassium ferrate under phase transfer catalysis" SYNTHESIS, vol. 10, 1984, pages 866-868, XP002438865
- D2: US 2003/146169 A1 (CIAMPI LEE EDWARD [US] ET AL) 7 August 2003 (2003-08-07)
- D3: EP-A-1 166 825 (SANDIA CORP [US]) 2 January 2002 (2002-01-02)
- D4: DATABASE WPI Week 200479 Derwent Publications Ltd., London, GB; AN 2004-797547 XP002438867 & CN 1 524 595 A (HUIYIN TEACHERS COLLEGE) 1 September 2004 (2004-09-01)
- D5: US 2003/055245 A1 (TSENG WEI-HONG [TW] ET AL) 20 March 2003 (2003-03-20)

2. NOVELTY:

2.1 INDEPENDENT CLAIMS 1, 5 and 17:

Document D1 discloses (p. 867, left column, second paragraph) an oxidation reaction using potassium ferrate and a phase transfer catalyst. In the solution of the reaction coexist the cation $C_6H_5CH_2N^+$ and the anion $FeO_4(VI)$. The solvent of the reaction is benzene in which the ferrate anion is not soluble. The cation of the phase transfer catalyst, the $C_6H_5CH_2N^+$ by complexing the $FeO_4(VI)$ transfers the latest in the organic phase and makes it reacting with the alcohols.

Further 10% aq. of NaOH is present as a buffer.

The examining division concludes that the compositions of claims 1,5 and 17 are unambiguously present in the reaction described in D1.

Accordingly the subject-matter of claims 1,5 and 17 is not new in the sense of Article 33(2) PCT.

2.2 INDEPENDENT CLAIMS 13 and 15:

Document D2 (p. 15, left column, par. 0214) discloses that contaminants in the petroleum industry effluents are eliminated by using ferrate.

Accordingly the subject-matter of claims 13 and 15 is not new in the sense of Article 33(2) PCT.

2.3 INDEPENDENT CLAIMS 9, and 11:

Document D2 discloses the use of ferrate(VI) for the treatment of contaminants in wastewaters (page 14-15). These contaminants are pesticides, herbicides, highly chlorinated phenol derivatives. D1 also discloses the decontamination of different sites from chemical warfare agents (p. 15, par. 0216). A lot of these contaminants are not soluble in water. However D1 does not disclose the use of a phase-transfer catalyst in combination with the ferrate(VI).

Accordingly the subject-matter of claims 9 and 11 is new in the sense of Article 33(2) PCT.

3. INVENTIVE STEP:

3.1 INDEPENDENT CLAIMS 9, and 11:

The document D2 is regarded as being the closest prior art to the subject-matter of claims 9 and 11 and discloses the use of ferrate(VI) for the treatment of contaminants in wastewaters (page 14-15). These contaminants are pesticides, herbicides, highly chlorinated phenol derivatives. D1 also discloses the decontamination of different sites from chemical warfare agents (p. 15, par. 0216) as well as the use of ferrate in synthetic chemistry (p. 3 par. 0044) and in selective oxidation of alkenes, alcohols etc. (p. 12. par. 0184).

The subject-matter of claims 9 and 11 differ from this known D2 in that the ferrate is used in combination with a phase transfer catalyst in order to oxidise efficiently contaminants

which are not soluble in water.

The problem to be solved by the present invention may therefore be regarded as how to use the ferrate(VI) which is water soluble in non aqueous solutions.

The solution proposed in claims 9 and 11 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

It is known from D2 that ferrate(VI) oxidises alcohols, chemical warfare agents, herbicides, contaminants in fuel etc. and is used in synthetic chemistry.

Document D1 discloses that the application of the ferrate oxidation to organic synthesis has been severely limited because the reaction using this reagent must be run in aqueous medium.

The solution proposed in D1 for this problem is the use of a transfer phase catalyst in combination with the ferrate.

Accordingly the problem posed in the application as well as the proposed solution are known from D1 and it is obvious to the person skilled in the art to apply this solution in order to oxidise other non water soluble compounds as chemical warfare agents, herbicides, contaminants in fuel etc.

4. DEPENDENT CLAIMS:

Dependent claims 2-4,6-8,10,12,14,16,18-35 do not contain any features which, in combination with the features of any claim to which they refer, meet the requirements of the PCT in respect of novelty and inventive step.

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PCT/US2005/041714